Proposed FRM for Coarse Particulate Matter (PM_c)

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Disclaimer

Although this work has been funded wholly by the United States Environmental Protection Agency, it has not been subjected to Agency review. Therefore, it does not necessarily reflect the views of the Agency. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

FRM Specifications — 40 CFR 50, Appendix O

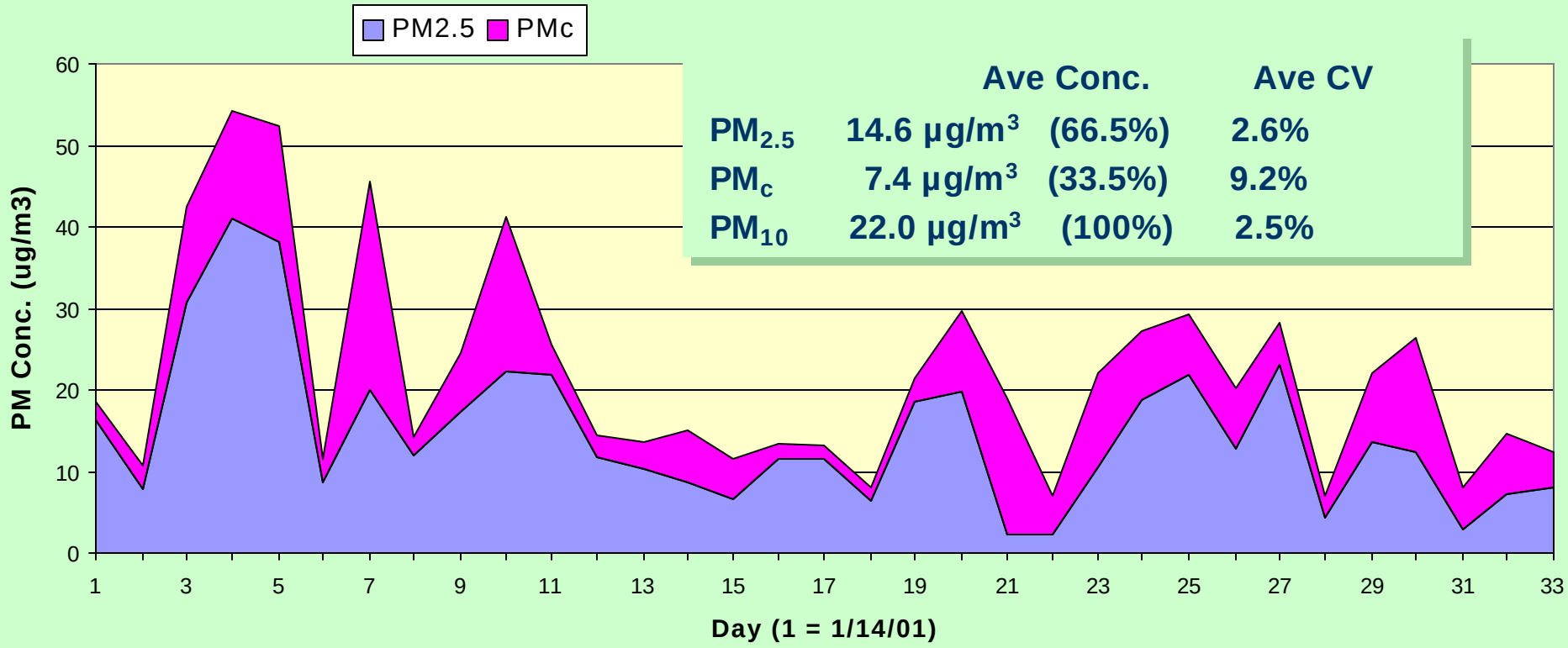
- $PM_c = PM_{10} - PM_{2.5}$
  - Separate samplers & measurements for PM_{10} and $PM_{2.5}$
  - PM_{10} - same as current requirements (Appendix L)
  - PM_{10} - same as current requirements for $\underline{PM_{2.5}}$ without WINS
    - Referenced to Appendix L
    - Current PM_{10} FRM & FEM requirements remain
    - "New" class of PM_{10} samplers - tentatively identified as "PM_{10c}"
  - Incidental $PM_{2.5}$ and PM_{10} measurements also valid

PM_c Measurement Performance

Lower concentration limit: 3 µg/m^3

	FRM	CT Field Study
$PM_{2.5}$	2 µg/m^3	~0.4 (2·SD) + 0.2 (FB)= ~0.6 µg/m^3
PM_{10}	2 µg/m^3	~0.8 (2·SD) + 0.2 (FB)= ~1.0 µg/m^3
PM_c	[3 µg/m^3] (Proposed)	~0.8 (2·SD) ± 0.2 (FB)= ~1.0 µg/m^3

PM10 Components—Windsor, CT



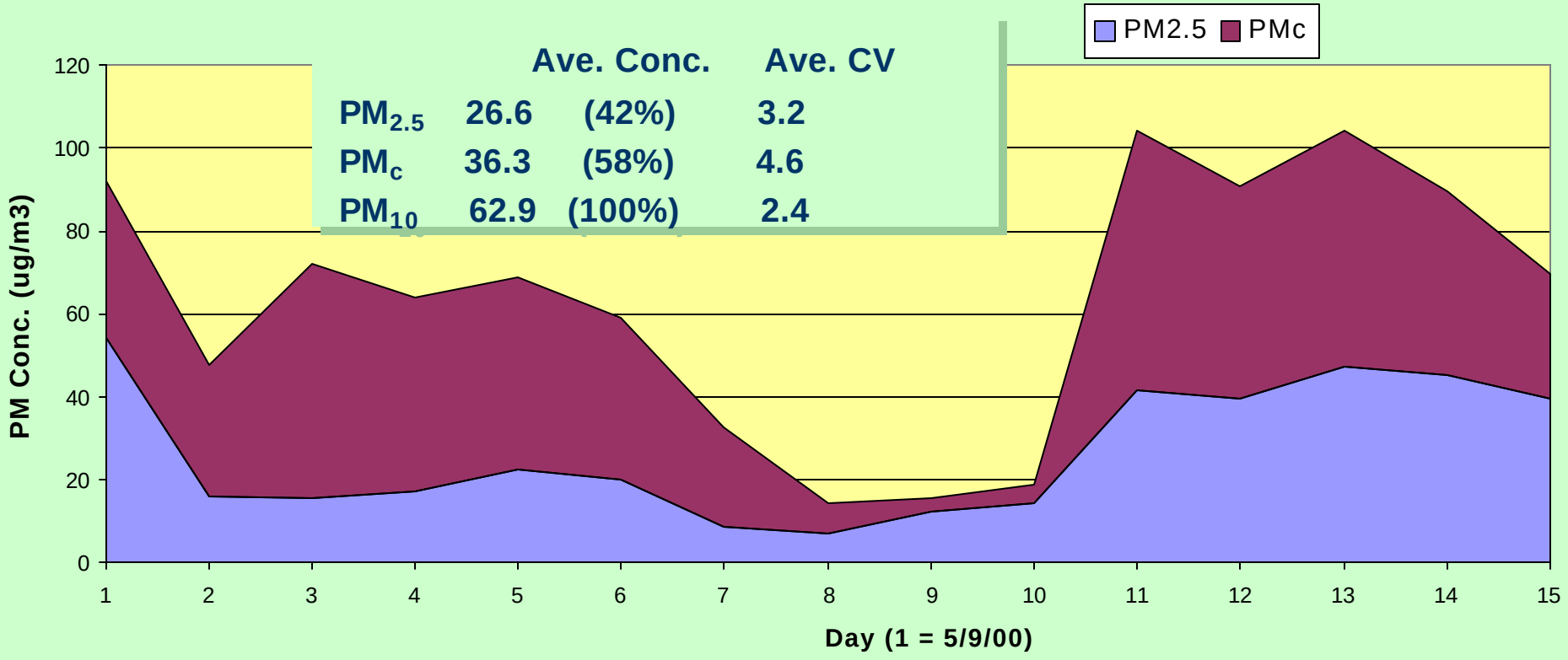
	Ave Conc.		Ave CV
$PM_{2.5}$	14.6 µg/m^3	(66.5%)	2.6%
PM_c	7.4 µg/m^3	(33.5%)	9.2%
PM_{10}	22.0 µg/m^3	(100%)	2.5%

PM_c Measurement Performance

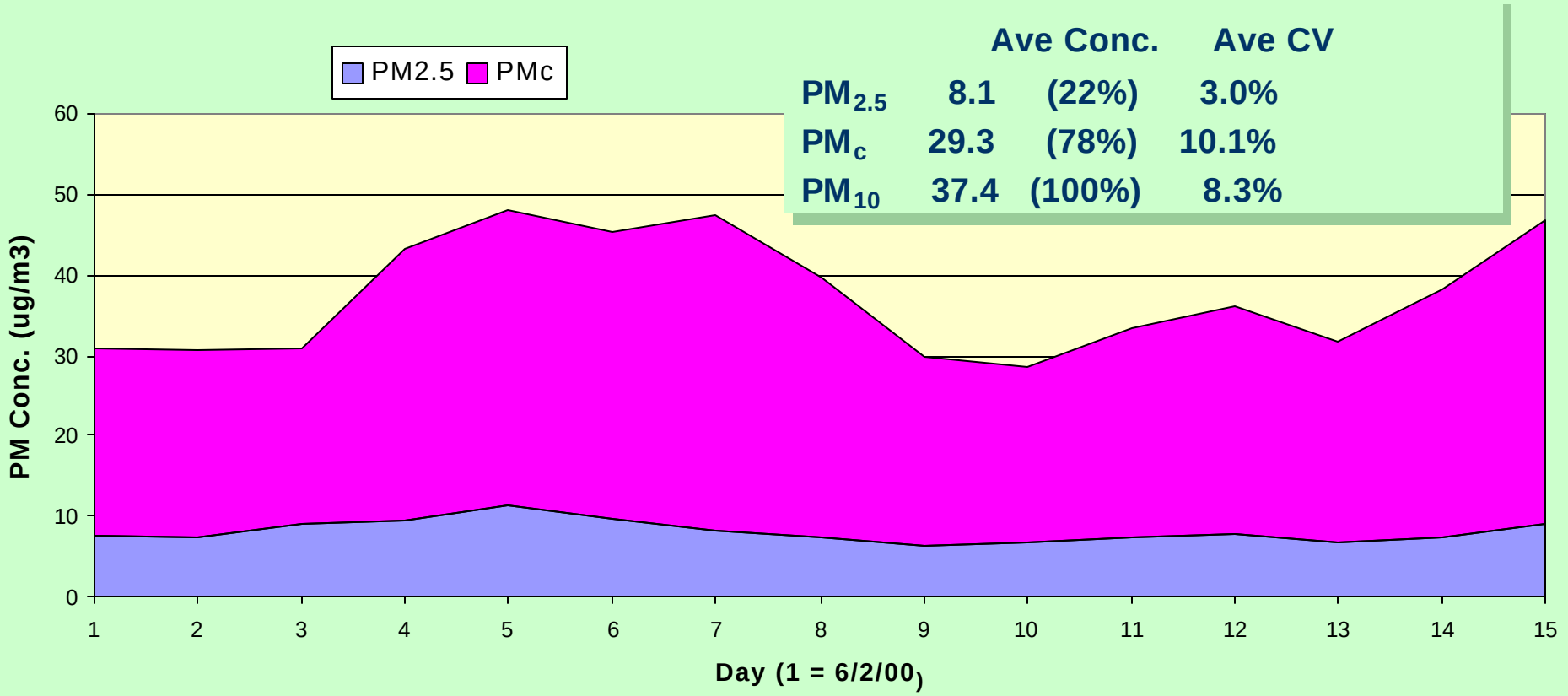
PMc field test precision (Windsor, CT)

	Conc >	n	Ave CV	Conc >	n	Ave CV
$PM_{2.5}$ (tripled)	0 µg/m³	33	2.64%	6 µg/m³	29	2.18%
PM_{10} (tripled)	0 µg/m³	33	2.47%	20 µg/m³	16	1.74%
PMc (tripled)	0 µg/m³	33	9.19%	4 µg/m³	21	6.59%
$PM_{2.5}$ (paired)	0 µg/m³	33	2.4%	6 µg/m³	29	2.0%
PMc (paired)	0 µg/m³	33	8.1%	4 µg/m³	21	5.8%

PM10 Components—Rubidoux, CA

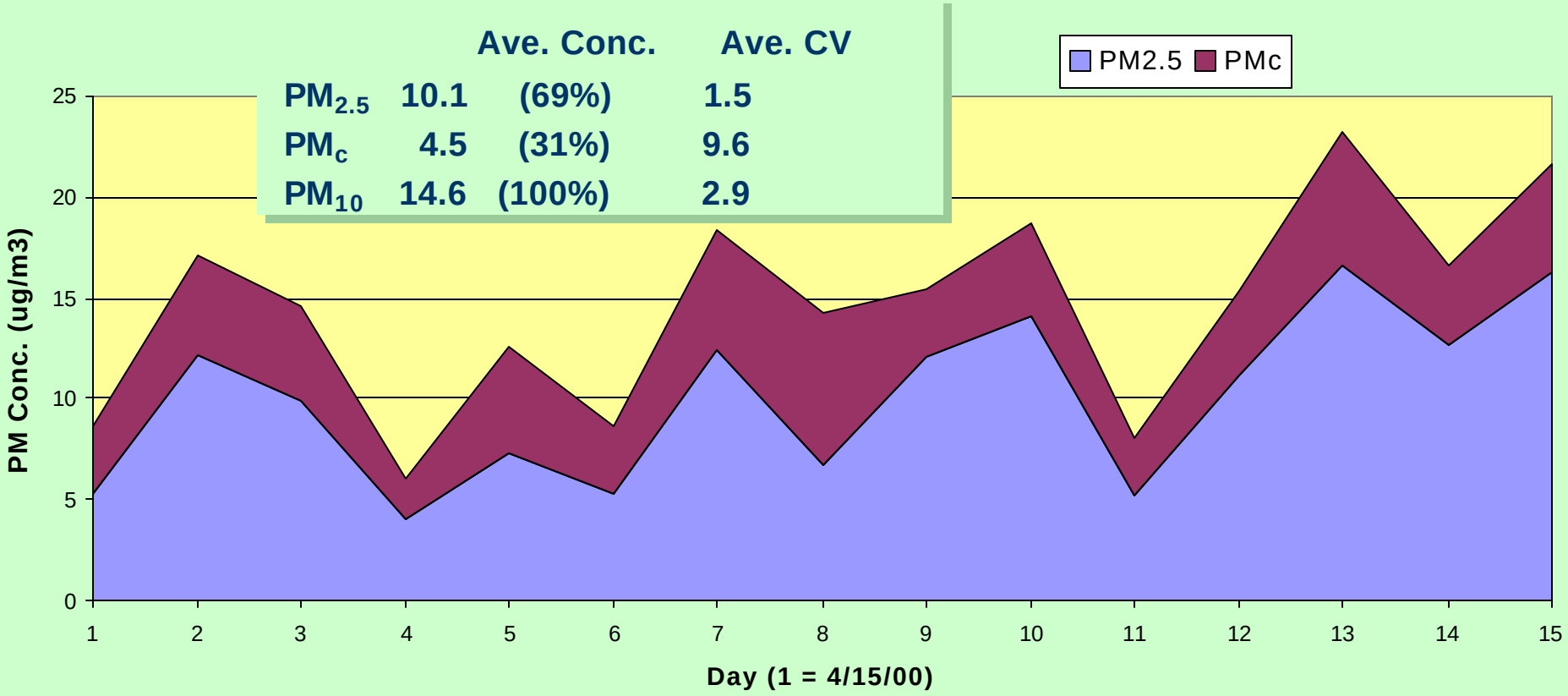


PM10 Components—Phoenix, AZ

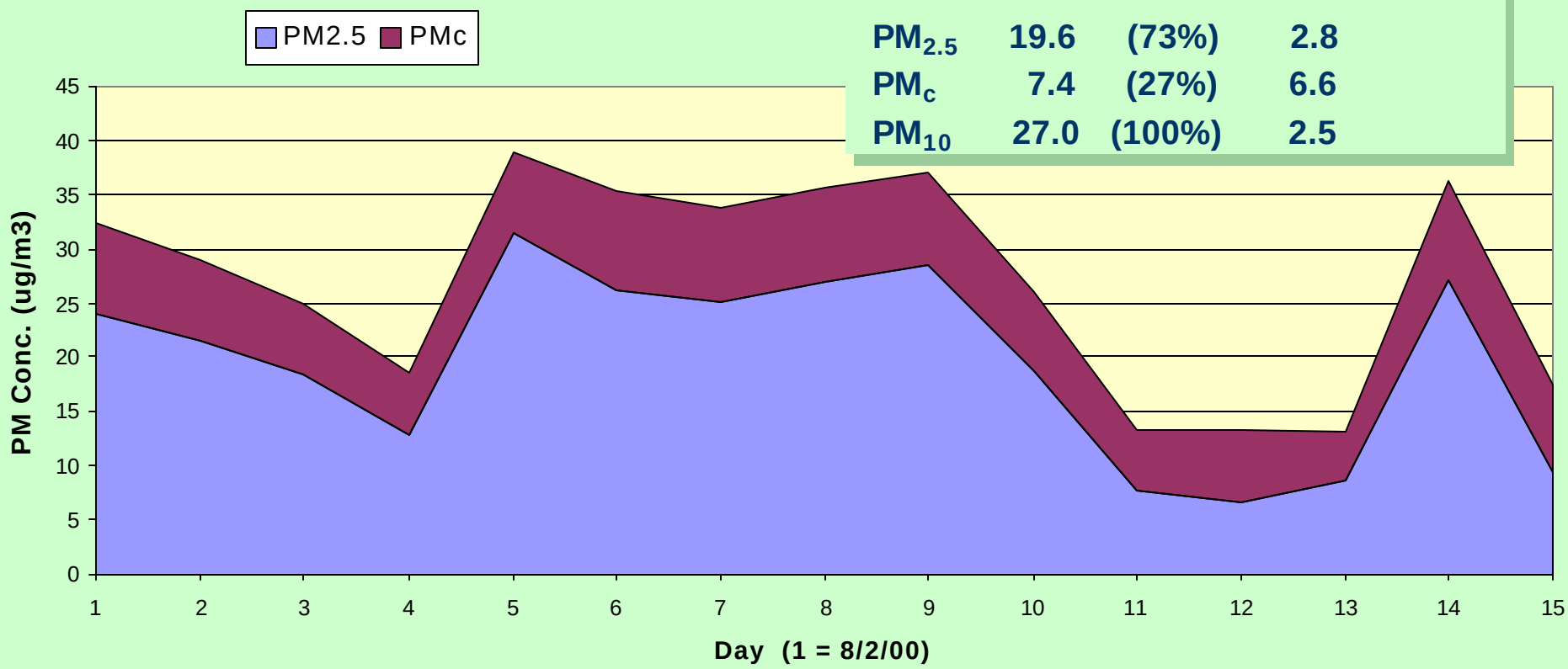


	Ave Conc.		Ave CV
$PM_{2.5}$	8.1	(22%)	3.0%
PM_c	29.3	(78%)	10.1%
PM_{10}	37.4	(100%)	8.3%

PM Components—RDU, NC



PM Components—Philadelphia



	Ave. Conc.		Ave. CV
$PM_{2.5}$	19.6	(73%)	2.8
PM_c	7.4	(27%)	6.6
PM_{10}	27.0	(100%)	2.5

PM_c Measurement Performance

PMc field test precision

Other PM_c CV's (n=15):

	Paired Samplers	Tripled Samplers
Rubidoux	4.1%	4.6%
Phoenix	9.1%	10.1%
RDU	8.3%	9.6%
Philadelphia	5.9%	6.6%

PM_c Measurement Performance

- **Precision DQO: 20% (CV)**

(excluding CVs at PM_c < 4 $\mu g/m^3$)

- **Network $PM_{2.5}$ precision for 1999: 9.1% → ~ 7%**

  (End of 1999 approaches 7%)

- **Using the ratio of the PM_c precision to the $PM_{2.5}$ precision as measured in our studies and multiplying by the established network precision our network performance estimate becomes:**

  6.59/2.18 × 7 = 21% (tripled data)

  5.8/2.0 × 7 = 20% (paired data)

PM_c Measurement Performance

- QA — Very similar to that for $PM_{2.5}$
  - Installation, time synchronization, calibration, maintenance
  - Matched filter handling, conditioning, weighing, calibration, etc.
  - Collocated sampler pair for precision
  - Flow audits
  - Collocated audits

Designation of Reference Methods for PM_c

- FRM sampler pair designated as FRM under Part 53
- Matched as to manufacturer but not necessarily model
- Only $PM_{2.5}$ sampler tested if PM_{10c} sampler is identical (less WINS)

Designation of Equivalent Methods for PM_c

- Classes I, II, and III - (same definition as for $PM_{2.5}$)
- Class I and III requirements provided - Class II unspecified
- Class I requirements similar to those for $PM_{2.5}$
  - 1 test site
  - 3 FRM and 3 candidate samplers at each site
  - Precision (both FRM and Candidate)-

    Either S.D. < 3 µg/m^3 or CV < 10%
  - Comparability: Slope 1 ±0.08

    Intercept 0 ±2 µg/m^3

    Correlation $ 0.96

Class III — New Requirements — Based on Draft for Class III $PM_{2.5}$

- 4 test sites in specified regions of U.S.
  (Cities in L.A. area, SW U.S., Gulf Coast, Northeast)
- Minimum of 2 FRM and 2 candidate samplers at each site
- Minimum of 5 comparisons/month, 30 per 3-month season
- Minimum of 4 seasons (120 comparisons) per site
- Same precision and comparability
  requirements as for Class I
- Applicable requirements of Appendix O and L
- Applicable laboratory tests in 53 Subpart E
- Other tests deemed necessary based on method (Subpart F)

Associated Changes to Other PM Equivalent Methods

- New Class III requirements defined for $PM_{2.5}$
  - Same field test requirements as for PM_c
  - Applicable requirements of Appendix L and Subpart E
  - Other tests deemed necessary based on the method (Subpart F)
  - Precision (both FRM and Candidate)-

    Either S.D. < 1 µg/m^3 or CV < 5%
  - Comparability: Slope 1 ±0.05

    Intercept 0 ±1 µg/m^3

    Correlation $ 0.97

Associated Changes to Other PM Equivalent Methods

- **New precision requirement applicable to all PM candidate methods**
  - **Same requirement as for FRM**
    - PM_{10}: Either S.D. < 5 µg/m^3 or CV < 7%
    - $PM_{2.5}$: Either S.D. < 1 µg/m^3 or CV < 5%
    - PM_c: Either S.D. < 3 µg/m^3 or CV < 10%
  - Same for all Classes
- **Field test procedures simplified somewhat**
  - **Both S.D. and CV calculated for all measurement sets -** Only one needs to meet specification
  - **Some adjustment to FRM precision requirements** ($PM_{2.5}$ reduced from 2 to 1 µg/m^3)
  - **Reduction in concentrations levels required**

FRM Specifications

- **Administrative changes**
  - **Elimination of FR notice upon receipt of application**
  - **Designation effective upon FR publication**
  - **Processing time for requests for approval of modifications**

    increased from 30 to 90 days

Draft Proposed PM_c FRM Provisions in Regulatory Format

- **Draft documents for review**
  - **Overview Documents**
    - **Cover Sheet**
    - **FRM Overview — Brief Overview of proposed new PM_c FRM approach**

Draft Proposed PM_c FRM Provisions in Regulatory Format

- 40 CFR Part 50, Appendix L *(Amended)* Replace DOW WINS oil with DOS oil
- 40 CFR Part 50, Appendix O *(New)* PM_c Reference Method Specifications
- 40 CFR Part 53, Subpart A *(Revised)* General requirements for FRMs & FEMs
- 40 CFR Part 53, Subpart C *(Revised)* Field comparison tests for FEMs
- 40 CFR Part 53, Subpart E *(Revised)* Lab. performance tests for FRMs & FEMs
- 40 CFR Part 53, Subpart F *(Revised)* Class II $PM_{2.5}$ lab. test requirements for FEMs

Issues

- **Consistency of language with related parts of the PMc package**
- **Generation of supplemental QA guidance (Document 2.12)**
- **Coordination of data quality assessment procedures**

  (Part 58, App. A)
- **Treatment of $PM_{2.5}$ (and PM_{10}, if applicable)**

  data incidental to PM_c
- **Further consideration of the proposed LCL (3 µg/m^3)**
- **Consideration of use of samples less than 23 hours**

  (Sec. 3.3 of App. O)
- **Further consideration of the proposed DQO for precision (20%) and the lower limit for including CV values (4 µg/m^3)**
- **Differentiation of "new" PM_{10} (PM_{10c}) samplers**
  - Status of PM_{10} after PM_c monitoring is implemented
  - Need for differentiation
  - Mechanisms for differentiation of samplers and data in AIRS
  - Ramifications of failure to differentiate

Issues

- **Continuous monitors**
  - Should Section 2.4 of 58 Appendix C (site-specific approval of undesignated monitor) be extended to PM_c?
  - Any changes?
  - Correlated acceptable continuous (CAC) analyzers
    - Should provisions be extended to PM_c?
    - If so, what will the monitoring data be used for?
    - How will the data be differentiated from FRM/FEM data?
    - Should there be any connection to FRMs, FEMs, or Part 53?
- **Review comments**
- **Preparation of submittal drafts (remove overstrikes, bold, italic, highlighting, etc. and prepare final *Federal Register* language)**